

Notice of Allowability

Application No.

10/762,821

Examiner

Zia R. Hashmi

Applicant(s)

RAY, ANDREW M.

Art Unit

2881

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 1/22/2004.
2. ☒ The allowed claim(s) is/are 1-24.
3. ☒ The drawings filed on 22 January 2004 are accepted by the Examiner.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some* c) ☐ None of the:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
(a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
(b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

- | | |
|---|---|
| 1. <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 5. <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 6. <input checked="" type="checkbox"/> Interview Summary (PTO-413),
Paper No./Mail Date <u>12/3/2004</u> . |
| 3. <input checked="" type="checkbox"/> Information Disclosure Statements (PTO-1449 or PTO/SB/08),
Paper No./Mail Date <u>1/22/2004</u> | 7. <input type="checkbox"/> Examiner's Amendment/Comment |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit
of Biological Material | 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance |
| | 9. <input type="checkbox"/> Other _____ |

DETAILED ACTION
EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such amendment, it MUST be submitted no later than the payment of the issue fee.

2. Authorization of the examiner's amendment was given in a phone interview with the inventor's representative Mr. Thomas G. Eschweiler on December 3, 2004:

Claims 25-32 have been canceled.

Allowable Subject Matter

3. Claims 1-24 are allowed.

4. The following is an examiner's statement of reasons for allowance:

5. With respect to independent claims 1 and 8, prior art fails to disclose a method of accounting for crystal cut error in an ion implantation system, which includes obtaining data relating to an orientation of a mechanical surface of a wafer relative to an ion beam directed at the surface of the wafer to implant ions within select locations. The method also includes obtaining data regarding features formed upon the surface of the wafer, including respective spacing existing between the features. Respective degrees of shading likely to result during ion implantation given the orientation of the ion beam and the feature data are then determined. Adjustments, if any, which need to be made

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to the orientation of the ion beam to adequately mitigate potential shadowing are then determined. Crystal cut error data relating to the orientation of the mechanical surface of the wafer relative to an actual lattice structure of the wafer is then obtained. The crystal cut error data is then used to determine the severity of channeling likely to result from the ion implantation given the orientation of the ion beam to the surface of the wafer and the orientation of the surface of the wafer to the lattice structure of the wafer.

Adjustments, if any, needed to be made to the orientation of the ion beam to achieve desired channeling are then determined. It is then determined whether the proposed adjustments to mitigate shadowing and the proposed channeling adjustments are coincident. If these proposed adjustments do not coincide, then an acceptable re-orientation of the ion beam is determined. The orientation of the ion beam relative to the mechanical surface of the wafer is finally adjusted as needed, and the process can then continue on for further fabrication of wafers.

6. With respect to independent claims 15 and 19, prior art fails to disclose a method of implanting ions within a wafer with an ion beam, comprising: obtaining crystal cut error data regarding a variation between a nominal crystalline lattice structure and an actual crystalline lattice structure and a mechanical surface of the wafer; obtaining data regarding features formed upon the surface of the wafer, including respective spacing existing between the features, and finally adjusting the orientation of the ion beam relative to the surface of the wafer to adequately mitigate shadowing and achieve desired channeling in light of the crystal cut error data and the feature data.

Furthermore, prior art fails to disclose a method of implanting ions into a workpiece comprising: obtaining implantation data relevant to determining a relative orientation between an ion beam containing the ions to be implanted and a surface of the workpiece into which the ions are to be implanted, determining what adjustments, if any, should be made to the relative orientation between the ion beam and the surface of the workpiece based upon the implantation data; and selectively adjusting the relative orientation between the ion beam and the workpiece surface based upon the adjustment determination.

Claims 2-7, 9-14, 16-18 and 20-24 are allowed by virtue of their dependencies on the independent claims 1, 8, 15 and 19, respectively.

Conclusion

7. Ryding et al. disclose (6,555,832) a method of crystallographic alignment and orientation of process wafers using a back scattered ion receiver mounted on the process chamber of an ion implanter.

8. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments of Statement of Reasons for Allowance".

9. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For

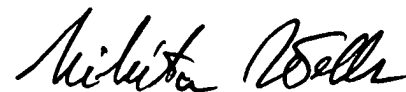
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more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact Electronic Business Center (EBC) at 866-217-9197 (toll-free).

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Zia Hashmi whose telephone number is (571) 272-2473. The examiner can normally be reached between 8.30 AM- 5 PM. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John R. Lee can be reached on (571) 272-2477.

Zia Hashmi

December 6, 2004.



NIKITA WELLS
PRIMARY EXAMINER

12/07/04